

DIVISION IV – BRIDGES AND STRUCTURES

SPECIAL PROVISION COPIED NOTES (SPCNs), SPECIAL PROVISION (SPs) and SUPPLEMENTAL SPECIFICATIONS (SSs)

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TABLE OF CONTENTS

STANDARD 400 SERIES SPCNs (SPECIAL PROVISION COPIED NOTES)	4-1
NONE	4-1
CNSP SELECT USE 400 SERIES SPCNs (SPECIAL PROVISION COPIED NOTES)	4-2
NONE	4-2
STANDARD 400 SERIES SPs (SPECIAL PROVISIONS)	4-3
S403B00 - DYNAMIC PILE TESTING FOR FRICTION PILES Re. 7-08c	4-4
S403C00 - DYNAMIC PILE TESTING FOR END BEARING PILES Re. 7-08	4-6
S403D00 - WAVE EQUATION ANALYSIS Re. 7-08	4-8
S404B00 - CONCRETE SURFACE COLOR COATING Re. 7-08c	4-12
S404C00 - GRAVITY FILLED POLYMER CRACK SEALING Re. 7-08c	4-14
S404D00 - SEALING EXPANSION JOINTS Re. 7-08c	4-16

*These SPECIFICATIONS REVISIONS are subject to change on short notice.

2007

S404F00 - CONCRETE SURFACE PENETRANT SEALER	Re. 7-08c.....	4-17
S407B00 - TOOTH EXPANSION JOINT	1-14-08c.....	4-18
S407D00 - METALLIZATION OF FERROUS METAL SURFACES	Re. 7-08c.....	4-19
——CNSP SELECT USE 400 SERIES SPs (SPECIAL PROVISIONS)——	4-22
ELASTIC INCLUSION	6-24-03a	4-23
——STANDARD 400 SERIES SSs (SUPPLEMENTAL SPECIFICATIONS)——	4-26
SS40501 - SUPP. SECTION 405—PRESTRESSED CONCRETE	8-7-08.....	4-27
SS40701 - SUPP. SEC. 407—STEEL STRUCTURES	1-25-10	4-28
SS41201 - SUPP. SEC. 412—WIDEN, REPAIR, & RECONSTRUCT EXIST. STRUCT.	8-5-08.....	4-29
SS41301 - SUPP. SEC. 413—DISMANTLE/REMOVE ALL/PART OF EXIST. STRUCT.	8-5-08.....	4-30
SS41401 - SUPP. SEC. 414—RIPRAP	1-25-10	4-31

1-
2-
3-
4-

——STANDARD 400 SERIES SPCNs (SPECIAL PROVISION COPIED NOTES)——

NONE

——**SELECT USE 400 SERIES SPECIAL PROVISION COPIED NOTES (SPCNs)**——

The following are Select Use Special Provision Copied Notes. None have been through the Department's complete Specifications Committee review/comment/acceptance process and are not part of the Standard Specifications. They are to be considered as project-specific and may be subject to modifications required to meet specific project conditions or requirements for Federal funding. Anyone making modifications is responsible for obtaining the appropriate expertise in the discipline applicable to the modification. If modifications are made the date must also be changed to reflect the current date. Please send a copy of the modified special provision copied note with the new date and specific project number to David.Gayle@VDOT.Virginia.gov so it may be added to the Specifications Stockpile.

NONE

——STANDARD 400 SERIES SPs (SPECIAL PROVISIONS)——

GUIDELINES — FOR PROJECTS REQUIRING DYNAMIC PILE TESTING FOR FRICTION PILES.**S403B00-0708****VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
DYNAMIC PILE TESTING FOR FRICTION PILES**May 25, 1999cc
Reissued July 2008c**I. DESCRIPTION**

This work shall consist of dynamic testing of driving test piles by the use of electronic monitoring equipment, reprocessing the data and furnishing a written report of the results.

II. EQUIPMENT

The Contractor shall furnish a Pile Driving Analyzer and all required associated equipment including transducers and accelerometers.

III. TESTING

The Contractor shall employ a firm experienced in the use of the pile driving analyzer and related equipment to install or supervise the installation of the necessary equipment and to perform the dynamic monitoring. Names of previously approved firms are on a Department approved list and will be made available upon request. If the Contractor wants to use a firm that is not on the approved list, documentation of such experience shall be submitted to the Engineer for approval prior to beginning the work.

Dynamic testing shall be conducted in the presence of the Engineer and during the entire time piles are initially driven or redriven and during pile restrike testing.

Where possible, splices shall be made prior to the start of driving so that dynamic testing can be performed without interruption.

The Contractor shall fasten a pair of transducers and a pair of accelerometers in place prior to testing. Piles shall be driven until the pile driving analyzer indicates that the soil resistance measured is 175 percent of the pile design capacity and the required minimum tip elevation and penetration have been obtained or as directed by the Engineer. The Contractor shall remove the transducers and accelerometers after the dynamic testing is completed.

Pile restrike testing shall be conducted no sooner than 120 hours after the pile, or any pile within a 25-foot radius has been driven. Restrike testing shall include dynamic testing of the pile when it is redriven. The pile shall be redriven with the same pile hammer used for initial driving. A cold hammer shall not be used for restrike. The amount of penetration required during restrike testing shall be 6 inches or a total number of 100 hammer blows, whichever occurs first, unless the analyzer indicates the soil resistance measured on restrike is less than 225 percent of the design capacity. If the soil resistance measured on restrike is less than required, the Engineer may direct the Contractor to drive all or a portion of the remaining test pile length and repeat the restrike testing. The Contractor will be notified of the necessity to perform a second restrike test within 3 days of receipt of the CAPWAP results from the initial restrike.

The Contractor shall notify the Engineer of the date and time for dynamic testing at least 48 hours prior to testing. Such notice shall be given during the normal work hours of the Department. If

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additional dynamic testing is ordered by the Engineer, the Contractor shall schedule the tests in cooperation with the Engineer.

The results of the dynamic testing shall be printed by the pile driving analyzer and shall include for each blow selected by the Engineer, a combination of the following quantities:

- Soil resistance from the Case Goble Method,
- Input and reflection values of force and velocity,
- Maximum transferred energy,
- Maximum compression force,
- Velocity and displacement,
- Blows per minute,
- Value of upward and downward traveling force wave,
- Ram stroke and corresponding blow sequence
- Maximum tensile and compressive stresses in the pile

A preliminary report with this information shall be provided to the Engineer within 24 hours after completion of the testing if so requested by the Engineer.

All signals shall be recorded and made available upon the request of the Engineer.

Accompanying the production pile order list, the Contractor shall furnish the Engineer a Pile Loading (if applicable) and Dynamic Testing Report that shall include the following information for each pile tested:

- Location of test,
- Date of test,
- Driving log, all data obtained during the test,
- Any unusual or otherwise noteworthy behavior observed during or after driving or testing,
- A resistance distribution plot and related information by the CAPWAP program for the end of initial drive conditions and the beginning of restrike conditions,
- Plot of applied load versus average butt settlement with determination of safe bearing capacity, as required by the specifications,
- A summary of soil resistance from both Loading and Dynamic Testing, including an evaluation of the correlation between the two approaches and discussion of any discrepancies,
- Recommendations for a refined wave equation analysis based on the above findings and recommended driving criteria for production piles

IV. MEASUREMENT AND PAYMENT

Dynamic pile testing (Friction Piles) will be measured and paid for at the contract unit price per each, which price shall be full compensation for furnishing, installing, and removing dynamic testing equipment, tools, labor, and incidental work necessary to monitor the dynamic testing, to provide the data and written report specified, drilling holes to mount transducers and accelerometers, all work and equipment necessary to drive the pile during restrike testing, and any additional driving required should the required soil resistance not be obtained. A second restrike test will be paid for at 2/3 of the contract unit price of a dynamic pile test.

Payment will be made under:

Pay Item	Pay Unit
Dynamic Pile Test (Friction Piles)	Each

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2007

GUIDELINES — FOR PROJECTS REQUIRING DYNAMIC PILE TESTING FOR END BEARING PILES.**S403C00-0708****VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
DYNAMIC PILE TESTING FOR END BEARING PILES**May 25, 1999c
Reissued July 2008**I. DESCRIPTION**

This work shall consist of dynamic testing of driving test piles by the use of electronic monitoring equipment, reprocessing the data and furnishing a written report of the results.

II. EQUIPMENT

The Contractor shall furnish a Pile Driving Analyzer and all required associated equipment including transducers and accelerometers.

III. TESTING

The Contractor shall employ a firm experienced in the use of the pile driving analyzer and related equipment to install or supervise the installation of the necessary equipment and to perform the dynamic monitoring. Names of previously approved firms are on a Department approved list and will be made available upon request. If the Contractor wants to use a firm that is not on the approved list, documentation of such experience shall be submitted to the Engineer for approval prior to beginning work.

Dynamic testing shall be conducted in the presence of the Engineer and during the entire time piles are initially driven or redriven.

Where possible, splices shall be made prior to the start of driving so that dynamic testing can be performed without interruption.

The Contractor shall fasten a pair of transducers and a pair of accelerometers in place prior to testing. Piles shall be driven until the pile driving analyzer indicates that the soil resistance measured is 225 percent of the pile design capacity and the required minimum tip elevation and penetration has been obtained or as directed by the Engineer. The Contractor shall remove the transducers and accelerometers after the dynamic testing is completed.

The Contractor shall notify the Engineer of the date and time for dynamic testing at least 48 hours prior to testing. Such notice shall be given during the normal work hours of the Department. If additional dynamic testing is ordered by the Engineer, the Contractor shall schedule the additional tests in cooperation with the Engineer.

The results of the dynamic testing shall be printed by the pile driving analyzer and shall include for each blow selected by the Engineer, a combination of the following quantities:

- Soil resistance from the Case Goble Method,
- Input and reflection values of force and velocity,
- Maximum transferred energy,
- Maximum compression force,
- Velocity and displacement,
- Blows per minute,

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Value of upward and downward traveling force wave,
Ram stroke and corresponding blow sequence
Maximum tensile and compressive stresses in the pile

A preliminary report with this information shall be provided to the Engineer within 24 hours of the testing if so requested by the Engineer.

All signals shall be recorded and made available upon the request of the Engineer.

Accompanying the production pile order list, the Contractor shall furnish the Engineer a Pile Loading (if applicable) and Dynamic Testing Report that shall include the following information for each pile tested:

Location of test,
Date of test,
Driving log, all data obtained during the test,
Any unusual or otherwise noteworthy behavior observed during or after driving or testing,
A resistance distribution plot and related information by the CAPWAP program,
Plot of applied load versus average butt settlement with determination of safe bearing capacity, as required by the specifications,
A summary of soil resistance from both Loading and Dynamic Testing, including an evaluation of the correlation between the two approaches and discussion of any discrepancies,
Recommendations for a refined wave equation analysis based on the above findings and recommended driving criteria for production piles

IV. MEASUREMENT AND PAYMENT

Dynamic pile testing (End Bearing) will be measured and paid for at the contract unit price per each, which price shall be full compensation for furnishing, installing, and removing the dynamic testing equipment, tools, labor, and incidental work necessary to monitor the dynamic testing, to provide the data and written report specified, and drilling holes to mount transducers and accelerometers.

Payment will be made under:

Pay Item	Pay Unit
Dynamic Pile Test (End bearing Piles)	Each

GUIDELINES — FOR PROJECTS REQUIRING DYNAMIC PILE TEST (ONLY WITH THE PAY ITEM).**S403D00-0708****VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
WAVE EQUATION ANALYSIS**May 25, 1999cc
Reissued July 2008**SECTION 403.06(d) 1. and 2.** of the Specifications is replaced by the following:

Pile driving equipment furnishing by the Contractor shall be subject to the approval of the Engineer.

Prior to driving test piles, the Contractor shall furnish the Engineer the following information pertaining to the proposed pile driving equipment:

1. Completed Pile and Driving Equipment Data Form for each proposed pile hammer and pile type combination (Attachment 1).
2. At each driving test location, where different subsurface conditions exist, the Contractor shall furnish a Wave Equation Analysis of pile driveability performed by a Professional Engineer experienced in such work, demonstrating that the piles can be driven with reasonable effort to the ordered lengths without damage. This analysis shall include the following:

Copies of computer input and output sheets and graphs showing soil resistance versus blow count as well as maximum tensile and compressive stresses versus blow count. Analyses shall be run at the estimated tip elevation as well as other required elevations to define maximum stress levels in the pile during driving.

The Contractor shall use the optimum type and size of hammer for the indicated pile and subsurface conditions at the structure site. Unless documentation supporting other values can be provided, the following hammer efficiencies shall be used in a wave equation analysis:

<u>Hammer Type</u>	<u>Efficiency in Percent</u>
Single acting air/steam	67
Double acting air/steam	50
Diesel	80
Hydraulic	90

The criterion that the Engineer will use to evaluate the driving equipment consists of both the required number of hammer blows per inch and the pile stresses at the required ultimate pile capacity. The required number of hammer blows indicated by calculations at the required bearing capacity shall be a maximum of 6 per inch for the driving equipment to be acceptable and shall be on the rising (or linear) portion of the resistance versus blow count curve.

Should the Wave Equation Analysis indicate the possibility of excessive driving stresses, the Contractor shall submit to the Engineer proposed corrective measures (modification of hammer stroke or other appropriate action) for approval.

The following criteria will be used in evaluating calculated results to determine acceptability of the Contractor's proposed driving system.

The calculated ultimate soil resistance as determined from wave equation analysis alone shall be no less than 275 percent of the required design capacity for the driven pile. When the calculated

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ultimate soil resistance determined from wave equation analysis has been calibrated to the results of a dynamic pile test, the ultimate soil resistance shall be no less than 225 percent of the required design bearing capacity for the driven pile.

Soil setup (pile freeze effect) may be considered when establishing initial driving criteria. If soil setup is considered, two additional wave equation analyses, one modeling the end of initial drive conditions and the second modeling the beginning of restrike conditions shall be performed. In lieu of performing the two additional wave equation analyses, a pile driveability analysis may be performed when considering soil setup. However, hammers requiring the consideration of soil setup for approval may require restrikes of the driving test piles, at the Contractor's expense, for verification purposes.

Contractor notification of acceptance or rejection of pile driving equipment will be made within 20 days of receipt of the data form and Wave Equation Analysis.

When initial parameters selected are judged to be inappropriate, the Contractor shall submit a refined wave equation analysis along with the pile order list. The refined analysis shall include any modifications or changes deemed appropriate from the results of the Driving Test (Loading Test and/or Dynamic Pile Testing) Program(s).

The Engineer will determine driving resistance, tip elevations and safe bearing capacity criteria to be used for production piles from the above information.

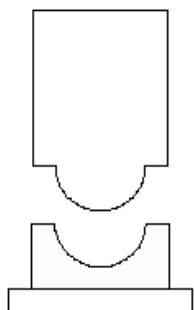
During production pile driving operations, the Contractor shall use the approved system. Any change in the driving system will only be considered after the Contractor has submitted revised pile driving equipment data and calculations.

Approval of pile driving equipment shall not relieve the Contractor of the responsibility to drive piles, free of damage, to the bearing and tip elevation shown on the plans, specified in the special provisions, or mandated by the Engineer. In addition, approval of pile driving equipment relative to driving stress damage shall not relieve the Contractor of responsibility for piles damaged because of misalignment of the leads, failure of capblock or cushion material, failure of splices, malfunctioning of the pile hammer, or other improper construction methods or practices.

Attachment 1

VIRGINIA DEPARTMENT OF TRANSPORTATION PILE AND DRIVING EQUIPMENT DATA FORM

Project: _____
 Pile Driving Contractor Or Subcontractor (Driven by): _____



HAMMER Manufacture: _____ Model: _____
 Type: _____
 Rated Energy: _____ @ _____ Length of Stroke
 Modifications: _____

RAM Ram Weight: _____

ANVIL OR BASE Weight: _____

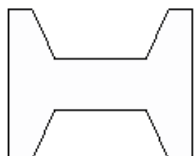
STRIKER PLATE Material: _____
 Thickness: _____ Area: _____
 Modulus of Elasticity - E: _____ (p.s.i.)
 Coefficient of Restitution: _____



CAP BLOCK Material: _____
 Thickness: _____ Area: _____
 Modulus of Elasticity - E: _____ (p.s.i.)
 Coefficient of Restitution: _____



PILE CAP Helmet _____ Weight: _____
 Bonnet _____ Materials: _____
 Anvil Block _____
 Remarks: _____
 Drive head _____
 Accessories _____



CUSHION Cushion Material: _____
 Thickness: _____ Area: _____
 Modulus of Elasticity - E: _____ (p.s.i.)
 Coefficient of Restitution: _____



PILE Type: _____
 Pile Size: _____ Length: _____ Diameter: _____
 Cross Sectional Area: _____
 Material: _____ Weight/Ft.: _____
 Design Pile Capacity: _____ (tons)
 Description of Splice: _____

Tip Treatment Description: _____

Remarks: _____

Submitted By: _____ Date: _____
 Company: _____ Phone: _____

Cc: District Bridge Engineer
 State Bridge Engineer
 Construction Manager

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2007

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GUIDELINES — FOR PROJECTS REQUIRING CONCRETE SURFACE COLOR COATING**S404B00-0708****VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
CONCRETE SURFACE COLOR COATING**August 1, 1991cc
Reissued July 2008c**I. DESCRIPTION**

This work shall consist of furnishing and applying concrete surface color coating in accordance with this provision and in conformity with the details and locations indicated on the plans. The color of the coating shall be similar to the Federal Standard Color Number specified on the plans or as approved by the Engineer.

II. MATERIALS

Concrete surface color coating shall be from the Department's current list of approved concrete surface color coatings.

III. DETAILED REQUIREMENTS

Except as otherwise specified on the plans, the concrete surface color coating shall be applied to the following surfaces of the bridge structure:

- a. Pier stems and caps from 6 inches below finished grade to the upper limits of the pier caps but excluding the top of the cap.
- b. Exposed surfaces of abutment walls from finished grade of adjacent concrete slab slope protection or 6 inches below finished grade of embankment to and including the top of the wingwall, excluding bridge seats and portion of back wall between limits of exterior structural members.
- c. All surfaces of parapet walls, the edge of deck slab and the underside of the bridge deck overhangs from the deck edge to the structural member.

Concrete surface color coating shall be applied to exposed surfaces of other concrete structures as specified on the plans.

The concrete surface color coating shall be applied in accordance with the manufacturer's recommendations, except as otherwise specified. The concrete surface color coating shall not be applied until all concrete placement operations for the particular structure have been completed. The concrete surface shall be clean, free of any curing agents, form release agents, foreign substances or signs of efflorescence at the time of application.

All work shall be performed by experienced workmen familiar with concrete finishing work and with the materials specified. Surfaces not to be treated shall be protected from splatter.

Materials shall be delivered to the job site in sealed containers bearing the manufacturer's labels. Materials shall be mixed and applied in accordance with the manufacturer's printed instructions of which two copies shall be furnished the Engineer.

IV. MEASUREMENT AND PAYMENT

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2007

Concrete Surface Color Coating will be paid for on a lump sum basis per structure wherein no other measurement will be made and will be paid for at the contract lump sum price per structure which price shall be full compensation for preparation of surfaces and for applying coating.

Payment will be made under:

Pay Item	Pay Unit
Concrete Surface Color Coating (Br. or Str. No.)	Lump Sum

GUIDELINES — USE WHEN REQUESTED BY THE DESIGNER.**S404C00-0708****VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
GRAVITY FILLED POLYMER CRACK SEALING**August 8, 1995cc
Reissued July 2008c**I. DESCRIPTION**

This work shall consist of filling concrete cracks with a polymer crack sealer, in accordance with the plan details and as directed by the Engineer.

II. MATERIALS

Gravity fill polymer crack sealers shall be a high molecular weight methacrylate, epoxy or urethane conforming to the following:

PROPERTY	TEST METHOD	REQUIREMENT
Gel Time 50 ml sample 75 ± 5° F	ASTM C881	6 hrs. max.
Tensile Strength 75 ± 5° F	ASTM D638	1,500 psi. min.
Sand Penetration MX-45 sand 75 ± 5° F	VTM 101	80% min.

III. SURFACE PREPARATION AND APPLICATION

Concrete cracks to be filled shall have reached the 28-day design requirement, shall be dry and free of dust, dirt and other debris prior to filling, and shall be air blasted with oil free compressed air prior to application of the sealer. The concrete surface temperature shall not be less than 55 degrees F when the sealer is applied. The sealer shall be applied during the lowest temperature period of the day, usually between 1 a.m. and 9 a.m., when the cracks are open to the greatest extent. Cracks wider than 1/25 inch shall be filled with dry No. 50 sieve size silica sand prior to placement of the polymer. The polymer shall then be applied directly to the cracks allowing time for the polymer to seep down into the cracks, then making additional applications until cracks are filled. The polymer material may also be spread over designated crack areas and worked into the cracks with a broom or squeegee. Excess polymer shall be brushed off the surface prior to the polymer hardening. Regardless of the application method used, the polymer shall be applied in sufficient quantity and applications to fill cracks level. An application rate of 1 gallon per 100 linear feet or 100 square feet is usually adequate. Application of the polymer crack sealer shall be completed prior to grooving of the deck surface and grooving shall not be performed until the polymer has cured a minimum of 48 hours.

The Contractor shall plan and prosecute the work in such a manner to protect persons, vehicles and the bridge structure from injury or damage. Armored joints shall be covered, scuppers plugged and cracks sealed from underneath or other protective measures necessary to protect traffic, waterways and bridge components shall be implemented. In the event polymer materials or solvents harm the appearance of

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bridge components, removal of such materials will be required as directed by the Engineer. Traffic will not be permitted on the treated surface until tacking will not occur as determined by the Engineer.

IV. MEASUREMENT AND PAYMENT

Gravity fill polymer crack sealing will be measured and paid for at the contract unit price per linear foot or square yard as specified. The price bid for such work shall be full compensation for furnishing and applying the silica sand and polymer crack sealer, for vehicular and pedestrian protection, for crack preparation, for protection of waterways and bridge surfaces and for all labor, tools and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Gravity fill polymer crack sealing	Linear foot or Square yard

GUIDELINES — FOR PROJECTS REQUIRING EXPANSION JOINTS CLEANED AND RESEALED ONLY.**S404D00-0708****VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
SEALING EXPANSION JOINTS**June 14, 2000c
Reissued July 2008c**I. DESCRIPTION**

This work shall consist of cleaning and sealing expansion joints in accordance with the contract documents and as directed by the Engineer.

II. MATERIALS

Expansion joint filler and sealer materials shall conform to the requirements of Section 212 of the Specifications.

III. PROCEDURES

Expansion joints shall be cleaned and shall be free of oil, grease, existing joint material or any other foreign material. Loose material shall be removed from the joint with oil-free compressed air delivered with not less than 120 cubic feet of air per minute and a nozzle pressure of not less than 90 pounds per square inch and not more than 200 pounds per square inch.

The Contractor shall protect the edges of pavement adjacent to the joints to be cleaned.

The Contractor shall install joint filler and sealer materials in strict accordance with the manufacturer's written instructions.

Expansion joints shall be filled and sealed in accordance with the requirements of Section 404.05 of the Specifications. Joints to be filled shall be completely dry and the ambient air temperature shall be at least 45 degrees F. The applied sealer and finished joint shall be free of entrapped air. Finished sealer shall conform to the lines and grades of existing pavement surfaces.

IV. MEASUREMENT AND PAYMENT

Clean and seal expansion joints will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall be full compensation for cleaning joints, furnishing and installing joint filler, joint sealer, removal and disposal of debris, and for all material, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item**Pay Unit**

Clean and seal expansion joint

Linear foot

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GUIDELINES — FOR PROJECTS REQUIRING CONCRETE SURFACE PENETRANT SEALER.**S404F00-0708****VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
CONCRETE SURFACE PENETRANT SEALER**August 1, 1991cc
Reissued July 2008c**I. DESCRIPTION**

This work shall consist of furnishing and applying a water repellant concrete surface penetrant in accordance with this provision and in conformity with the details and locations indicated on the plans. The color of the penetrant sealer shall be clear.

II. MATERIALS

The penetrant sealer used in the performance of this work shall be a product as listed on the Department's current list of approved penetrating sealers.

III. PROCEDURES

The penetrant sealer shall be applied in accordance with the manufacturer's recommendations, except as otherwise specified herein. The penetrant sealer shall not be applied until all adjacent or superimposed concrete placements have been completed. All surfaces to receive the penetrant sealer shall be sandblasted to provide a clean uniform texture free of foreign substances such as oils, release agents, curing agents or efflorescence. All sandblasting residue shall be completely removed prior to application of the penetrant sealer.

Each container of penetrant sealer material shall be thoroughly mixed in strict compliance with the manufacturer's recommendations. The penetrant sealer material shall be applied by experienced persons using spray, brush or roller and shall not be thinned or reduced, except as may be specifically required by the manufacturer.

The rates of application and number of coats shall be in accordance with the manufacturer's recommendations.

IV. MEASUREMENT AND PAYMENT

Concrete surface penetrant sealer will be measured in square yards and will be paid for at the contract unit price per square yard, which price shall be full compensation for surface preparation and for applying sealer.

Payment will be made under:

Pay Item	Pay Unit
Concrete Surface Penetrant Sealer	Square Yard

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2007

GUIDELINES — FOR PROJECTS REQUIRING TOOTH EXPANSION JOINTS. WHEN THIS SECTION APPLIES INCLUDE THE FOLLOWING IN THE PROPOSAL: SS22601 Structural Steel.

S407B00-0708

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
TOOTH EXPANSION JOINT

January 14, 2008c

I. DESCRIPTION

This work shall consist of furnishing and installing tooth expansion joints in accordance with these specifications and in conformity with the lines, grades and locations shown on the plans or established by the Engineer.

II. MATERIALS

Materials shall conform to the requirements of Sections 212 and 226 of the Specifications.

III. PROCEDURES

Working drawings showing complete details and dimensions of the tooth expansion joint and other pertinent information, shall be submitted to the Engineer for review in accordance with Section 105.10 of the Specifications.

Fabrication shall conform to the requirements of Section 407 of the Specifications.

Tooth expansion joints shall seal the deck surface, gutters, curbs, and parapets to prevent water and other contaminants from seeping onto the substructure.

Final sealing of the finished joint shall be completed as soon as practicable after installation.

Surfaces exposed to roadway traffic shall have antiskid provisions.

IV. MEASUREMENT AND PAYMENT

Tooth expansion joint will be paid for in linear feet measured along the pavement surface from out to out of the deck slab, complete-in-place for the tooth thickness specified.

Payment shall be full compensation for furnishing and installing tooth expansion joint and all necessary components and anchoring devices and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item

Pay Unit

Tooth Expansion Joint (Tooth thickness)

Linear Foot

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GUIDELINES — USE WHEN REQUESTED BY THE DESIGNER**S407D00-0708**

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
METALLIZATION OF FERROUS METAL SURFACES

January 5, 1998c
Reissued July 2008c

SECTION 407—STEEL STRUCTURES of the Specifications is amended as follows:

Section 407.01—Description is amended to include the following:

All non-stainless ferrous metal, unless galvanized or protected with other specified coatings, shall be metallized as specified herein.

Section 407.02—Materials is amended to include the following:

Wire material for metallizing shall be zinc, or 85/15 zinc/aluminum alloy as certified by the manufacturer. The materials shall conform to the following quantitative requirements:

Zinc:

Element	Content (%)
Iron (Fe)	0.0015% max.
Cadmium (Cd)	0.0015% max.
Lead (Pb)	0.003% max.
Copper (Cu)	0.004% max.
Zinc (Zn)	Balance

85/15 zinc/aluminum:

Element	Content (%)
Iron (Fe)	0.020% max.
Copper (Cu)	0.004% max.
Cadmium (Cd)	0.004% max.
Lead (Pb)	0.004% max.
Titanium (Ti)	0.002% max.
Aluminum (Al)	14.0%-16.0%
Zinc (Zn)	Remainder

The manufacturer shall furnish a Certificate of Analysis for each batch of material supplied. Each container or coil wrapping shall be properly labeled to identify component type, supplier, size, batch number and wire lot number.

The size of wire material shall be in accordance with the manufacturer's recommendations for the Flame or Arc Sprayed method. Powder material shall not be used.

All bolts, nuts, and washers shall be hot dipped galvanized, in accordance with ASTM A153.

Sealers and topcoats, if specified on the plans, shall be selected from one of the following systems:

*These SPECIFICATIONS REVISIONS are subject to change on short notice.

2007

Manufacturer	DFT, mils
Carboline:	
Rustbond Penetrating Sealer	1.0-2.0
or Rustbond LT	1.0-2.0
Carboline 133 HB topcoat	2.0-3.0
ICI Devco Coatings:	
Pre-Prime 167	0.5-1.5
Devthane 378 topcoat	2.0-3.0
Xymax:	
Monolock PP	1.5-2.5
Bridge Finish topcoat	1.0-2.0

Material as applied shall not exceed 3.5 pounds per gallon VOC.

Section 407.04—Fabrication Procedures is amended to include the following:

Surface preparation for, and application of, metallizing shall be performed in accordance with ANSI/AWS C2.18-93. Flame cut edges shall be ground to remove the carburized surface prior to blasting. Blasting or metallizing shall not be performed when the surface temperature of or metallizing shall not be performed when the surface temperature of the steel is less than 5 degrees F above the dew point as determined by a surface thermometer. Surfaces to be metallized shall be blast cleaned with a grit abrasive to provide a surface profile of 2.0-4.0 mils with an anchor tooth profile that is sharp, clean and free of embedded friable material with minimal peening effect. Steel shot and silica sand shall not be used. Surfaces shall be metallized within 8 hours after blasting. If flash rusting should occur prior to metallizing, the metal surface shall be reblasted. Surfaces shall be metallized to a thickness of at least 5 mils in accordance with the wire manufacturer's recommendation.

Before starting work, the Applicator shall apply the recommended thickness of the coating to a 2-inch by 4-foot 8-inch by 0.05-inch steel coupon and bend it 180 degrees around a 0.5-inch mandrel to demonstrate the quality and adherence of the coating. Any disbonding or delamination of the coating which exposes the substrate shall require corrective action and additional testing before the metallizing process may continue.

If a sealer is specified, after metallization, bolted surfaces shall be masked off and all other surfaces shall be sealed within 8 hours of metallizing. Sealer and topcoat shall be applied in accordance with the manufacturer's recommendations with regard to application temperature and humidity.

All fully coated and cured assemblies shall be protected from handling and shipping damage with the prudent use of padded slings, dunnage, separators and tie downs. Loading procedures and sequences shall be designed to protect all coated surfaces. Any damaged areas shall be repaired in accordance with the manufacturer's recommendations. Where sealer and/or topcoating is specified, all bolts and areas that were not sealed or topcoated in the shop shall be prepared and sealed or topcoated after erection in accordance with the manufacturer's recommendations.

The Contractor shall provide the Engineer with documentation, which indicates that the applicator has performed successful metallizing work for the last three years.

Section 407.07—Measurement and Payment is amended to include the following:

*These SPECIFICATIONS REVISIONS are subject to change on short notice.

2007

No separate measurement and payment will be made for metallization of surfaces; therefore, the cost for all labor, materials, transportation, blasting, cleaning, metallizing, sealing and topcoating to the proper completion of the work shall be included in the lump sum price bid for structural steel.

——**SELECT USE 400 SERIES SPs (SPECIAL PROVISIONS)**——

The following are Select Use Special Provisions. None have been through the Department's complete Specifications Committee review/comment/acceptance process and are not part of the Standard Specifications. They are to be considered as project-specific and may be subject to modifications required to meet specific project conditions or requirements for Federal funding. Anyone making modifications is responsible for obtaining the appropriate expertise in the discipline applicable to the modification. If modifications are made the date must also be changed to reflect the current date. Please send a copy of the modified special provision with the new date and specific project number to David.Gayle@VDOT.Virginia.gov so it may be added to the Specifications Stockpile.

SU421000A Elastic Inclusion (EPS).doc**GUIDELINES — USE WHEN REQUESTED BY THE DESIGNER.**

VIRGINIA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION FOR
ELASTIC INCLUSION

June 24, 2003a

I. DESCRIPTION

Elastic Inclusion work shall consist of installation of an elasticized Expanded Polystyrene (EPS) and geotextile separation fabric between the back of concrete surfaces and backfill material, in accordance with these specifications and in conformity with manufacturer's recommendations, the lines shown on the plans or as established by the Engineer.

II. MATERIALS

- (a) **Elasticized Expanded Polystyrene (EPS):** EPS shall have a size tolerance of 1/8 inch for each dimension and conform to the following:

Physical Property	Test Method	Requirements
Compressive strength	D-1621	720 psf +/-60 psf @10% strain
Water absorption	C-272	Max. 3% by volume
Insect Resistance	D-3345-74	Resistance to ants, termites, etc.

The EPS shall be elasticized, with a linear-elastic stress-strain behavior up to 10 percent strain and linear proportional stress-strain behavior up to 30 percent strain.

The EPS shall contain no chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), hydrofluorocarbons (HFCs) or formaldehyde. It shall be chemically and biologically inert when in contact with acidic and alkaline soils. It shall be treated to prevent insect attack.

Materials shall withstand temperature variations from 0°F to 140°F without deforming and shall maintain their original dimensions and placement without chipping, spalling, or cracking. Material shall not deteriorate because of contact with sodium chloride, calcium chloride, mild alkalis and acids, or other ice control materials.

The EPS shall contain a flame retardant additive.

- (b) **Geotextile Separation Fabric:** A non-woven geotextile separation fabric shall be placed between the EPS and the backfill material. Fabric joints shall have a minimum overlap of twelve inches. Fabric shall extend a minimum of twelve inches beyond the EPS surface and overlap with adjacent concrete surface.

The separation fabric shall have the following properties:

Physical Property	Test Method	Requirements
Grab Strength	D-4632	Min. 250 lb
Puncture Strength	D-4833	Min. 112 lb
Tear Strength	D-4533	Min. 90 lb
Permittivity	D-4491	Min. 0.5 sec ⁻¹
Apparent Opening Size	D-4751	Max. No. 50 sieve

*These SPECIFICATIONS REVISIONS are subject to change on short notice.

Geotextile separation fabric shall be protected from mud, dirt, dust, sunlight, and debris during transport and storage. Material shall be inert to commonly encountered chemicals; resistant to mildew, rot, insects, and rodents; and biologically and thermally stable. Geotextile separation fabric for subsurface installation shall not be exposed to direct sunlight for more than 24 hours during installation.

Tensile strength requirements are in the machine and cross-machine directions.

- (c) **Adhesive:** Adhesive shall be used to bond the EPS to concrete surfaces and the separation fabric to the EPS. It shall be applied in accordance with the EPS manufacturer's recommendations.
- (d) **Backfill Material:** Backfill material adjacent to the separation fabric shall be as specified in the contract documents.

III. PROCEDURES

- (a) **Preparation of Concrete Surface:** Before placement of EPS, concrete surfaces shall be abrasive blast cleaned with a positive contact sandblaster or adhesives manufacturer's recommendation and approved by the Engineer to remove all non-adherent laitance, oil, grease or other foreign or deleterious matter.

- (b) **Installation of Material:**

The EPS shall be attached to the back of the concrete surfaces with an adhesive compatible with the material.

The concrete surface must be thoroughly dry and clean for adhesive for the application of the EPS. Adhesive shall be applied in accordance with the adhesive manufacturer's recommendation or approval.

The separation fabric may be installed after the EPS has been installed or it may be pre-attached to the EPS. The separation fabric shall cover all exposed surfaces of the EPS.

EPS and separation fabric shall be installed in accordance with the manufacturer's recommendations.

IV. TESTING

Elasticized EPS shall be tested by an independent commercial laboratory, to verify the material requirements specified herein. The Contractor shall provide written documentation of all tests specified. Documentation shall include style, lot, roll numbers, and actual results of each test. In addition, the name, address, phone number of the testing laboratory, and date of testing shall be provided.

Geotextile separation fabric shall be tested by an independent commercial laboratory, to verify the material requirements specified herein. The Contractor shall provide written documentation of all tests specified. Documentation shall include style, lot, roll numbers, and actual results of each test. In addition, the name, address, phone number of the testing laboratory, and date of testing shall be provided.

After the EPS has been installed and before the work has been accepted, the Contractor and Inspector shall perform a visual inspection of EPS coverage and adhesion to the concrete surface.

Any area deemed unacceptable and questionable as to remaining in position during the placement of the backfill material shall be replaced or repaired, as required.

REPAIR OF FAILED AREA OF EPS: Unacceptable portion of the EPS shall be removed and the concrete surface shall be prepared and the EPS installed in accordance with this special provision. New EPS in the repair areas shall be visually inspected after curing. The cost of all additional work for repairing or replacing of the defective joint material shall be borne by the Contractor.

IV. MEASUREMENT AND PAYMENT

Elastic inclusion, when a pay item, will be measured in square yards along the back of backwall surface area, complete-in-place, and will be paid for at the contract unit price per square yard. Such price shall be full compensation for cleaning surface, for furnishing and installing the EPS material in accordance with these Specifications and the manufacturer's recommendations, separation fabric, testing, and for all material, labor, tools, equipment and incidentals necessary to complete the work. When not a pay item, the cost thereof shall be included in the price for other appropriate pay items.

Payment will be made under:

Pay Item	Pay Unit
Elastic Inclusion (Thickness)	Square Yard

——**STANDARD 400 SERIES SSs (SUPPLEMENTAL SPECIFICATIONS)**——

*These SPECIFICATIONS REVISIONS are subject to change on short notice.

2007

GUIDELINES — FOR PROJECTS REQUIRING PRESTRESSED CONCRETE

SS40501-0609

August 7, 2008

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 405—PRESTRESSED CONCRETE

SECTION 405—PRESTRESSED CONCRETE of the Specifications is amended as follows:

Section 405.05(h) Handling, Storing and Erecting is amended to add the following:

Continuity diaphragms for prestressed beams shall not be cast until at least 90 days after the strands in the beams have been detensioned.

GUIDELINES — FOR USE WHEN STEEL STRUCTURES WITH HIGH STRENGTH BOLTS ARE REQUIRED.

SS40701-0310

January 25, 2010

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 407—STEEL STRUCTURES****SECTION 407—STEEL STRUCTURES** of the Specifications is amended as follows:

Section 407.06(c)3.b.—Direct tension indicators is amended to replace the first paragraph with the following:

- b. **Direct tension indicators:** When direct tension indicators are used, installation shall be in accordance with the requirements of Section 407.06(c)3 of the Specifications. However, the indicator washer shall not be considered a substitute for the required hardened washer under the turned element but may be considered a substitute for the hardened washer required under the unturned element when bolts conforming to the requirements of ASTM A 490 are used with steel conforming to the requirements of ASTM A 709, Grade 36. Direct tension-indicator washers shall not be painted or coated with any epoxy or similar material prior to installation. The normal installation shall consist of the load indicator being placed under the unturned bolt head or unturned nut. However, if conditions required installation under the turned bolt portion, a hardened flat washer or nut face washer shall be fitted against the tension-indicating protrusions. Tension-indicating washers shall not be substituted for the hardened washers required with short-slotted or oversized holes but may be used in conjunction with them.

GUIDELINES — PROJECTS REQUIRING WIDENING, REPAIRING, AND RECONSTRUCTING OF EXISTING STRUCTURES.

SS41201-0609

August 5, 2008

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 412—WIDENING, REPAIRING, AND RECONSTRUCTING EXISTING STRUCTURES

SECTION 412—WIDENING, REPAIRING, AND RECONSTRUCTING EXISTING STRUCTURES is amended as follows:

Section 412.03—Procedures is amended to replace the fourth paragraph with the following:

Loose and unsound materials shall be removed by the use of hand tools or pneumatic hammers weighing a nominal 35 pounds or less. Hammer weight applies to the weight of the pneumatic hammer alone. Pneumatic hammers shall be worked at an angle of 45 to 60 degrees to the plane of the concrete surface being removed. The surface shall be sounded with a masonry hammer to determine the relative concrete strength.

GUIDELINES — USE WHEN DISMANTLING AND REMOVING ALL OR PORTIONS OF EXISTING STRUCTURES IS REQUIRED.

SS41301-0609

August 5, 2008

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS**SUPPLEMENTAL SECTION 413—DISMANTLING AND REMOVING EXISTING STRUCTURES OR REMOVING PORTIONS OF EXISTING STRUCTURES****SECTION 413—DISMANTLING AND REMOVING EXISTING STRUCTURES OR REMOVING PORTIONS OF EXISTING STRUCTURES** of the Specifications is amended as follows:**Section 413.02(b) Removing Portion of Existing Structure** is replaced with the following:

- (b) **Removing Portion of Existing Structure:** The portions to be removed shall be the areas designated on the plans. No portion of the structure shall be removed by blasting or other methods that may damage any portion of the structure that will remain in place. When pneumatic hammers are used to remove concrete, the weight of the hammer alone shall be not more than a nominal 90 pounds for widening work or a nominal 35 pounds for deck repair work. The use of tractor-mounted demolition hammers with a maximum manufacturer's rated striking energy of 1,000 foot-pounds will be permitted for the removal of concrete parapets down to the top of deck and for that portion of the deck where the reinforcing steel will be removed. The use of tractor-mounted demolition hammers or pneumatic hammers weighing more than a nominal 35 pounds shall not be allowed for the removal of that portion of the deck that is within 6 inches of the top flange of the beams/girders to remain in the structure. With the written approval of the Engineer, hydraulically actuated, jaw type, concrete crushers may be used for the removal of concrete parapets down to the top of the deck. The approval of hydraulically actuated, jaw type, concrete crushers shall be contingent upon continuous satisfactory results with no damage to any portion of the structure that is to remain in place. The removal of concrete parapet on prestressed concrete slab spans or prestressed concrete box beam spans shall be limited to nominal 35-pound pneumatic hammers within 2 inches of the deck and not more than nominal 90-pound pneumatic hammers for the remainder of the parapet unless otherwise approved by the Engineer.

Disturbed areas shall be uniformly graded to natural ground contours in a manner that will facilitate drainage and prevent impoundment of water.

Materials or portions of existing structures removed shall be handled in accordance with the requirements of (a)1. herein.

*These SPECIFICATIONS REVISIONS are subject to change on short notice.

GUIDELINES — FOR USE WHEN RIPRAP IS REQUIRED.

SS41401-0310

January 25, 2010

VIRGINIA DEPARTMENT OF TRANSPORTATION
2007 ROAD AND BRIDGE SUPPLEMENTAL SPECIFICATIONS

SUPPLEMENTAL SECTION 414—RIPRAP

SECTION 414—RIPRAP of the Specifications is amended as follows:

Section 414.04—Measurement and Payment is amended to replace the ninth and tenth paragraphs with the following:

Riprap will be paid for at the contract unit price. This price shall include furnishing and placing riprap, including welded wire fabric, mortar, or grout; excavation; and riprap bedding. These prices shall include geotextile bedding material when required. The price bid shall include preparing the surface, furnishing and installing geotextile bedding material, overlaps, repair work, and excavating and backfilling toe-ins.

